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SYNOPSES OF NORTH-AMERICAN INVERTEBRATES.

XIII. The Actiniaria.

G. H. PARKER.

The Actiniaria, or sea anemones, are marine animals inhabiting the shallow and deeper waters of our coasts, and usually found attached to some rock or other firm object. They have been justly noted for their exquisite colors and forms. As a rule, each species is represented by separate individuals or *polyps*, but in the Zoantheæ (Fig. 22) colonies are formed by budding, much as in many corals. The sea anemones are further characterized by the fact that they produce no independent skeleton and that their tentacles are very usually simple or undivided. In the more typical species the polyp has the form of a short cylinder, the attached end of which is known as the *pedal disk*, the free end the *oral disk*, and the intermediate part the *column*.

The pedal disk is the organ of attachment for those species that are fixed and the chief organ for locomotion for those that move. It is usually well developed, but in species inhabiting muddy or sandy bottoms it is either reduced, as in Ammophilactis (Fig. 12), or entirely absent, as in the Edwardsiæ (Fig. 1) and the Ceriantheæ (Fig. 21).

The column is generally undivided, but in Halcampa (Fig. 3) as many as three parts can be distinguished: a pedal *physa* of small extent, an intermediate *scapus* corresponding to the column in the restricted sense, and an oral *capitulum*, which often suffers involution when the polyp contracts. The surface of the column is either smooth or more or less covered with eminences, known as *tubercles* (Figs. 9, 10). In the Sagartinæ (Fig. 17) the column wall is very usually pierced by pores, *cinclides*, through which water from the internal cavity of animal and nettling filaments, *acontia*, may escape. The cinclides are sometimes borne on tubercles, which are then called *cinclidial tubercles*. In rare cases, as, for instance, Epiactis (Fig. 8), the eggs seem to be carried in pits on the column, and the young may be retained in these egg pits for a considerable period. The oral edge of the column is at times characterized by a series of enlargements that are probably neither tubercles nor tentacles, but have been called *marginal spherules*. Usually the oral edge of the column passes directly over into the tentacle-bearing portion of the oral disk. In some species, however, a fold is interpolated in this region, giving rise to what has been called a *collar*. The column, though usually strictly naked, may be covered with a slight secretion, *cuticula*, which may be firm and rough, as in Phellia, or slightly adhesive, so as to accumulate sand particles, as in Epizoanthus.

The oral disk carries the circle of *tentacles*. These are hollow processes from the wall of the disk and are usually pointed, though sometimes blunt or even club-shaped, as in Eloactis (Fig. 4). They are usually firmly attached to the oral disk, but in Bolocera (Fig. 6) the region of attachment is marked by a well-developed circular muscle, by whose contraction the base of the tentacle may be much constricted or even cut through, thus setting the tentacle free. As a rule, the tentacles cover a single circular area intermediate in position between the mouth and the margin of the oral disk. In Cerianthus (Fig. 21), however, they form two distinct bands, one *marginal* (principal) and the other *circumoral* (accessory). The *mouth* lies in the center of the oral disk and is generally surrounded by swollen lips. In Bicidium a portion of the lip is so much enlarged as to produce a projecting proboscis, the *conchula*.

Of the internal structure of the sea anemones little need be said in this connection, as the features upon which the following key is based are chiefly external. The mouth leads into a *gullet* or *œsophagus*, which opens at its pedal end into the one internal cavity possessed by the animal, the *gastrovascular space*. This is partly divided by membranous partitions, or *mesenteries*, that start from the inner surface of the column wall and project centrally. From the inner edge of the mesenteries come the nettling filaments, or acontia, already mentioned. The line of attachment of a mesentery to the column wall is often marked, as in the Edwardsiæ (Fig. 1), by a depressed line or furrow on the exterior of the column.

A second internal feature of importance is the *sphincter*, or circular muscle, in the region between the oral disk and the column. This muscle, by virtue of which the upper part of the column may be puckered over the oral disk when this is contracted, lies either in the intermediate layer of the body wall (mesoglœa), as in the Paractidæ, or in the inner layer (endoderm), as in the Bunodidæ. These distinctions are not easily made out unless the region in question is examined microscopically. When the sphincter is poorly developed, as in the Boloceridæ, the polyps, even when contracted, usually leave their tentacles exposed.

The following key gives the species of Actiniaria recorded for North America at depths within 100 fathoms of the surface and occurring north of Florida on the east coast, and north of southern California on the west coast. In indicating the geographical range the following abbreviations have been used:

N., Arctic Ocean to Cape Cod.
M., Cape Cod to Cape Hatteras.
S., Cape Hatteras to Florida.
A., Arctic Ocean to Puget Sound.
P., Puget Sound to San Francisco.
D., San Francisco to Southern California.

KEY TO THE TRIBES OF THE SUBORDER ACTINIARIA.

1. Colonial . . . . Zoantheæ 58
1. Not colonial 2
2. Tentacles in two circles, one marginal (principal) and the other circumoral (accessory) . . . . Ceriantheæ 56
2. Tentacles in a single circle 3
3. Column smooth, wrinkled, or with longitudinal furrows, at least twelve in number (six pairs of mesenteries) . . . . Hexactiniæ 7
3. Column with eight longitudinal furrows (eight mesenteries) Edwardsiæ 4

GENERA AND SPECIES OF EDWARDSIÆ.

4. Tentacles sixteen or fewer . . . . . . Edwardsia 5
4. Tentacles more than sixteen, usually at least twenty-four, Edwardsiella 6
5. Polyp slender; tentacles sixteen; non-parasitic *Edwardsia elegans* Ver., N., low water

5. Polyp very slender, length 30 mm., diameter 1.5 mm.; tentacles sixteen; parasitic on *Mnemiopsis leidyi* . . *E. leidyi* Ver., M.[1]

6. Polyp slender, length 125 mm., though capable of contracting to 35 mm., diameter 4 mm.; tentacles twenty to thirty-six; column with a brownish investment, except at aboral end, which is naked *E. sipunculoides* (Stimp.) Andres, N., low water (Fig. 1)

6. Polyp slender, length 25–35 mm., diameter 2.5–3 mm.; tentacles twenty-four to thirty; column including aboral end with a brownish investment . . . . *E. lineata* (Ver.), M., 4–12 fathoms

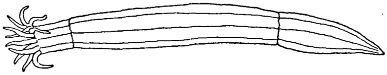

FIG. 1.—*Edwardsiella sipunculoides* (Stimp.) Andres. After Verrill.

FAMILIES OF HEXACTINIÆ.

7. Pedal disk absent . . . . Ilyanthidæ 11
7. Pedal disk present 8
8. Acontia present . . . . Sagartidæ 38
8. Acontia absent 9
9. Sphincter diffuse and weak . . . . . . Boloceridæ 18
9. Sphincter strong 10
10. Sphincter endodermal (column usually tuberculated) Bunodidæ 20
10. Sphincter mesoglœal (column usually not tuberculated) Paractidæ 31

GENERA AND SPECIES OF ILYANTHIDÆ.

11. Conchula (proboscis) present . . . . . . Bicidium 12
11. Conchula absent 13
12. Polyp elongated, length 30 mm., diameter 6 mm., longitudinal sulcations twelve; tentacles twelve; usually parasitic on *Cyanea arctica* *Bicidium parasiticum* Ag., N. (Fig. 2)
13. Column divided into three sections, an oral retractile capitulum, an intermediate scapus, and a pedal physa . . . Halcampa 14
13. Column continuous, not divided into sections 15
14. Polyp elongated, length 25 mm., diameter 3 mm.; tentacles twelve *Halcampa farinacea* (Ver.) Andres, N., 8–90 fathoms (Fig. 3)
14. Polyp slender; tentacles about twenty-four *H. pallida* (Ver.) Andres, N., low water
15. Tentacles blunt or club-shaped . . . . . Eloactis 16
15. Tentacles tapering to a point . . . . . . Ilyanthus 17
16. Polyp much elongated, length 200–250 mm., which may by contraction be reduced to 75 mm., diameter 18 mm., longitudinal sulcations twenty; tentacles twenty *Eloactis producta* (Stimp.) Andres, M., low water (Fig. 4)

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[1] Known only as an immature form.

17. Polyp elongated, tapering from oral to aboral end, length 25 mm., greatest diameter 6 mm.; tentacles thirty-six, in two imperfect rows *Ilyanthus lævis* Ver., N. (Fig. 5)

17. Polyp rather slender, tapering from oral to aboral end, length about 90 mm., greatest diameter 18 mm.; tentacles numerous, in several rows . . . . *I. chloropsis* Ver., S.

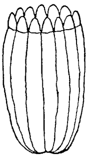
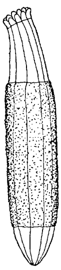


FIG. 2.



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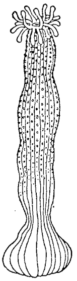

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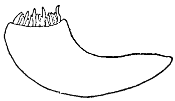


FIG. 5.

FIG. 2. — *Bicidium parasiticum* Ag. After Verrill.
FIG. 3. — *Halcampa farinacea* (Ver.) Andres. After Verrill.
FIG. 4. — *Eloactis producta* (Stimp.) Andres. After Verrill.
FIG. 5. — *Ilyanthus laevis* Ver.

SPECIES OF BOLOCERIDÆ.

18. Tentacles with strong sphincter muscles at base (often deciduous) Bolocera 19

19. Polyp broad and low, height about 30 mm., diameter of oral disk about 200 mm.; tentacles several hundred, crowded, in some twenty indistinct rows . . *Bolocera multicornis* Ver., N., 45 fathoms

19. Polyp massive, height about 100 mm., diameter of oral disk 150–250 mm.; tentacles numerous, in some three concentric rows *B. tuediæ* (Johnst.) Gosse, N., 37–365 fathoms (Fig. 6)

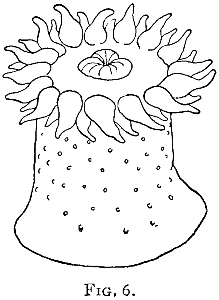
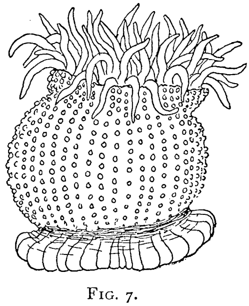


FIG. 6.



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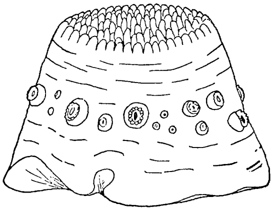
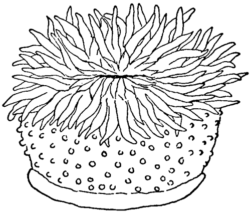


FIG. 8.

FIG. 6. — *Bolocera tuediæ* (Johnst.) Gosse. After Andres.
FIG. 7. — *Evactis artemisia* (Dana) Ver. After Dana.
FIG. 8. — *Epiactis prolifera* Ver. After Verrill.

GENERA AND SPECIES OF BUNODIDÆ.

20. Column perforated by numerous pores through which water may be discharged . . . . Evactis 21
20. Column not perforated by pores 22
21. Polyp broad and low, diameter of oral disk 60 mm. ; tentacles in three series . . . *Evactis artemisia* (Dana) Ver., P. (Fig. 7)
22. Column surrounded at its middle by a band of egg pits Epiactis 23
22. Column without egg pits 24
23. Polyp 10 mm. in height, diameter of aboral disk 12 mm. ; tentacles about ninety-six ; egg pits as many as thirty to forty, often containing young, which then resemble buds *Epiactis prolifera* Ver., P. (Fig. 8)
24. Column with scattered tubercles 25
24. Column with tubercles in longitudinal rows 28



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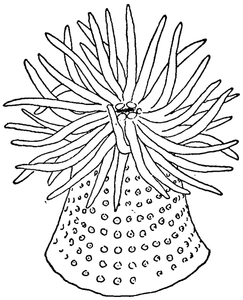

FIG. 10.

FIG. 9. — *Tealia crassicornis* (Müll.) Gosse. After Andres.
FIG. 10. — *Bunodes stella* Ver. After Verrill.

25. Oral edge of column with marginal spherules . . Phymactis 26
25. Oral edge of column without marginal spherules . . Tealia 27
26. Polyp 50 mm. in height, diameter of oral disk 38 mm. ; tentacles ninety-six, in four circles *Phymactis cavernata* (Bosc) Andres, S., between tides
27. Polyp 50 mm. in height, diameter of oral disk 120 mm. ; tentacles 160 *Tealia crassicornis* (Müll.) Gosse, A., N., 16–40 fathoms (Fig. 9)
28. Tubercles forming rows on column from oral to aboral end Bunodos 29
28. Tubercles limited to oral portion of column . . Aulactinia 30
29. Polyp 50 mm. in height, diameter of oral disk 35 mm. ; tentacles large, forty-eight to seventy-two *Bunodes stella* Ver., N., tide pools (Fig. 10)
30. Polyp columnar, height 150 mm., greatest diameter 35 mm. ; tentacles ninety-six, in four circles *Aulactinia capitata* Ver., M., S., low water

GENERA AND SPECIES OF PARACTIDÆ.

31. Inner tentacles many times longer than outer . Actinostola 32

31. All tentacles of about the same length 33

32. Polyp massive, height 150–180 mm., diameter of oral disk 200–250 mm.; tentacles numerous
Actinostola callosa Ver., N., M., 45–300 fathoms (Fig. 11)

33. Diameter of pedal disk much less than that of column Ammophilactis 34

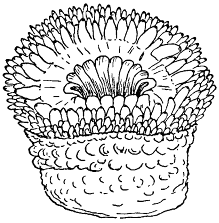

FIG. 11.

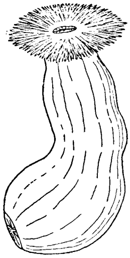

FIG. 12.

FIG. 11. — *Actinostola callosa* Ver. After Verrill.
FIG. 12. — *Ammophilactis rapiformis* (Les.) Ver. After Verrill.

33. Diameter of pedal disk as great as that of column or greater 35

34. Height of column 80 mm., diameter of oral disk 25 mm., of column 12–25 mm., of pedal disk 10–12 mm.; tentacles numerous (144 or more)
Ammophilactis rapiformis (Les.) Ver., M., tide pools (Fig. 12)

35. Sphincter well developed, collar pronounced, especially in contracted specimens . . . . · Stomphia 36

35. Sphincter poorly developed, collar scarcely noticeable, even in contracted specimens · . . . . Paractis 37

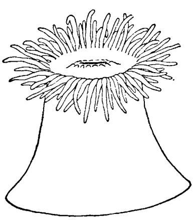

FIG. 13.

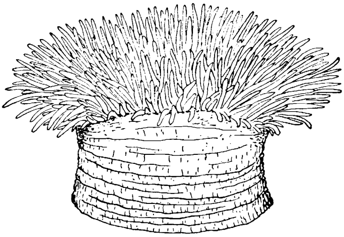

FIG. 14.

FIG. 13. — *Stomphia carneola* (Stimp.) Ver. After Verrill.
FIG. 14. — *Paractis perdix* Ver. After Verrill.

36. Height of column 50 mm., diameter of oral disk about 37 mm.; tentacles ninety-six or more, in two or three crowded marginal rows
Stomphia carneola (Stimp.) Ver., N., 8–35 fathoms (Fig. 13)

37. Height of column 75–100 mm., diameter of oral disk about 125 mm.; tentacles very numerous (about 384)
Paractis perdix Ver., M., 62–192 fathoms (Fig. 14)

Subfamilies of Sagartidæ.

38. Column divided into two segments, an oral capitulum and an aboral scapus; cinclides usually absent . . . . Phellinæ 53
38. Column undivided; cinclides usually present . . Sagartinæ 39

Genera and Species of Sagartinæ.

39. Column wall smooth or with only very slight evidence of tubercles, no cinclidial tubercles 40
39. Cinclidial tubercles present 48
40. Oral disk lobed, tentacles very numerous . . Metridium 41
40. Oral disk not lobed, tentacles numerous . . . Sagartia 42

Species of Metridium.

41. Column 100 mm. in height, diameter of oral disk 75 mm.; tentacles very numerous, the central ones longest *Metridium marginatum* (Les.) M. Edw., N., M., low water to 90 fathoms (Fig. 15)
41. Polyp as in preceding species but with tentacles longer and more slender . . . . *M. fimbriatum* Ver., P., low water [1]

Species of Sagartia.

42. Tentacles peripheral, so that more than half of the oral disk is exposed 43
42. Tentacles covering oral disk so that very little or none of it is exposed 44
43. Height of column 15–25 mm., diameter 10–20 mm.; tentacles about fifty, in two, three, or more rows, rather small
Sagartia spongicola Ver., M., 72–158 fathoms
44. Height of column less than 10 mm. 45
44. Height of column about 20 mm. 46
44. Height of column 40 mm. or more 47
45. Surface of column smooth, height 5–8 mm., diameter 4–6 mm.; tentacles eighty-four, in four rows, central ones longest
S. luciæ Ver., M., N., tide pools
45. Surface of column broken by longitudinal and transverse furrows, height 6 mm., diameter of pedal disk 10–14 mm., of oral disk 6 mm., tentacles long, sixty-four, in four rows
S. pustulata McMur., M., shallow water

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[1] Probably synonymous with *M. marginatum*.

46. Height of column 20 mm., diameter 3–4 mm.; tentacles forty-eight, in four rows . . . *S. gracillima* McMur., M., shallow water

47. Height of column 63 mm., diameter 15 mm.; tentacles about sixty, rather short, length less than the diameter of the oral disk *S. modesta* Ver., M., low water (Fig. 16)

47. Height of column 40 mm., diameter 25–35 mm.; tentacles numerous, in three to five rows, longer than the diameter of the oral disk *S. abyssicola* (Kor. and Dan.) Ver., N., M., 75–640 fathoms

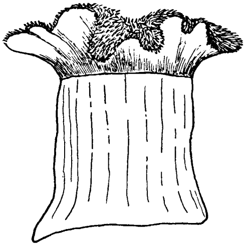

FIG. 15.

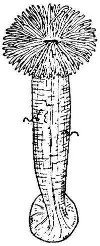

FIG. 16.

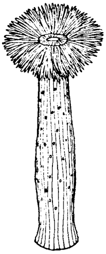

FIG. 17.

FIG. 15. — *Metridium marginatum* (Les.) M. Edw.

FIG. 16. — *Sagartia modesta* Ver. After Verrill. On the sides of the column several twisted acontia are seen, their points of exit marking the positions of cinclides.

FIG. 17. — *Cylista leucolena* (Ver.) Andres. After Verrill.

OTHER SPECIES OF SAGARTINÆ.

48. Cinclidial tubercles small, in irregular vertical lines . . Cylista 50

48. Cinclidial tubercles large 49

49. Cinclidial tubercles forming a band around middle of column Aiptasia 51

49. Cinclidial tubercles forming a band around pedal end of column Adamsia 52

50. Height of column 63 mm., diameter 10 mm.; tentacles ninety-six, in five rows, slender, and longer than twice the diameter of the column *Cylista leucolena* (Ver.) Andres, M., shallow water (Fig. 17)

51. Height of column 38 mm., diameter of oral disk 18 mm.; tentacles ninety-six, in four rows, length of inner tentacles 20 mm., of outer ones 6 mm. *Aiptasia pallida* (Ver.) Andres, S., shallow water

52. Height of column 75 mm., diameter 43 mm.; tentacles very numerous (500 or more in large specimens); on dead shells inhabited by hermit crabs *Adamsia tricolor* (Les.) Duch. and Mich., S., shallow water

52. Height of column 10–14 mm.; tentacles numerous, in two circles; young on dead shells inhabited by hermit crabs (*Catapagurus socialis* Smith), later the shell may be dissolved, the polyp having formed a horny hood in which the crab protects its abdomen *A. sociabilis* Ver., M., 76–410 fathoms (Fig. 18)

GENERA AND SPECIES OF PHELLINÆ.

53. Capitulum with longitudinal ridges, scapus strongly tuberculate Actinauge 54

53. Capitulum smooth, scapus granulated . . . . . Phellia 55

54. Height of column 80–150 mm., diameter 50–100 mm.; tentacles ninety-six, in five rows *Actinauge verrillii* McMur., N., M., S., 50–506 fathoms (Fig. 19)

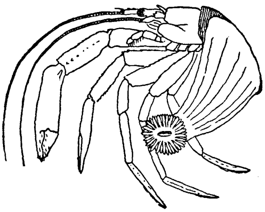

FIG. 18.

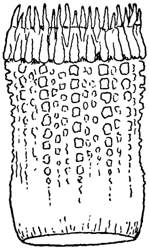

FIG. 19.

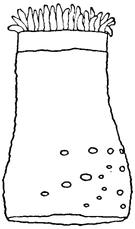

FIG. 20.

FIG. 18. — *Adamsia sociabilis* Ver. After Verrill. The cinclidial tubercles that occur near the pedal margin of the column in this species are not represented in the figure.

FIG. 19. — *Actinauge verrillii* McMur. After Verrill.

FIG. 20. — *Phellia arctica* Ver. After Verrill.

55. Height of column (contracted) 18 mm., diameter of oral disk 5 mm.; scapus with rough, thick cuticula; below the middle are several transverse rows of large egg pits *Phellia arctica* Ver., A., 30 fathoms (Fig. 20)

SPECIES OF CERIANTHEÆ.

56. Aboral end rounded and provided with a pore; aboral portion of column contained within a secreted tube . . Cerianthus 57

57. Column cylindrical, tapering aborally, length 600 mm. (contracted, 200 mm.), diameter of column near middle, 25 mm.; marginal tentacles (125 or more) 32–38 mm. in length, circumoral tentacles 18 mm. in length *Cerianthus americanus* Ver., M., S., shallow water (Fig. 21)

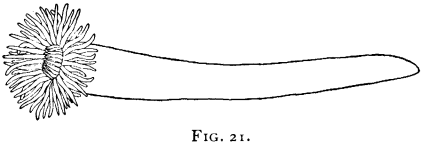

FIG. 21.

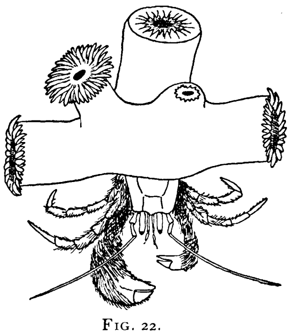

FIG. 22.

FIG. 21. — *Cerianthus americanus* Ver. After McMurrich.

FIG. 22. — *Epizoanthus americanus* Ver. After Verrill.

57. Column cylindrical, tapering aborally, length 450 mm., diameter 40 mm.; tentacles very numerous; marginal tentacles of different lengths, outer ones 25 mm. long, inner ones 56 mm. long; circumoral tentacles 25 mm. long, in several rows
C. borealis Ver., N., M., 7–150 fathoms

SPECIES OF ZOANTHEÆ.

58. Surface of body more or less incrusted with sand grains
Epizoanthus 59

59. Colonies of from three to ten or more polyps growing out of a common flesh; height of polyp about 25 mm.; tentacles thirty-eight or more; attached to stones or to dead snail shells inhabited by hermit crabs (in many instances the shelly material has disappeared, leaving the common flesh of the colony to form an investment for the crab)
Epizoanthus americanus Ver., N., M., 28–466 fathoms (Fig. 22)

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